FACT SHEET FOR NPDES PERMIT WA0023361
CITY OF BUCKLEY WASTEWATER TREATMENT PLANT

5/5/2003

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES) permits, which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the state of Washington to administer the NPDES permit program. Chapter 90.48 Revised Code of Washington (RCW) defines the Department of Ecology's (Department) authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the state include procedures for issuing permits [Chapter 173-220 Washington Administrative Code (WAC)], technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant:	City of Buckley P.O. Box 1960 Buckley, WA 98321
Facility Name and Address:	Buckley Wastewater Treatment Facility 600 Hatch Avenue Buckley, Washington 98321 Pierce County
Type of Treatment:	Oxidation Ditch Secondary Treatment with Chlorine Disinfection
Discharge Location:	White River at Buckley, River Mile 21.8 Latitude: 47º 10' 19" N Longitude: 122º 02' 08" W.
Water Body ID Number:	WA-10-1040

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

Buckley's wastewater treatment plant was originally constructed in 1952 with a design flow of 300,000 gallons per day. The 1952 facility contained a grit removal chamber, a mechanical shredder, Imhoff tank, chlorination facilities, four sludge drying beds, and an 18-inch cast iron effluent line. In 1980 the plant was upgraded to the present facility to achieve secondary treatment.

COLLECTION SYSTEM STATUS

The sewer collection system for the City of Buckley was originally built in the early 1930s as a combined storm and sanitary sewer system. Over the years, extensions and sewer separations have occurred resulting in a total pipeline length of approximately 85,705 feet. The older gravity sewer mains consist of clay pipes with mortared bell-spigot type joints. More recent construction is primarily 8- and 10-inch concrete and PVC pipe with rubber joints. However, less than 1/3 of the system has been installed with this type of construction.

The City's existing sanitary sewer system consist of approximately 75,105 lineal feet of gravity sewers , 10,600 lineal feet of 6-inch or 4-inch force mains, and 273 manholes. The system is more or less divided into two parts by State Route 410. Flow on the southeast side of the highway is transported under SR 410 at Wheeler and Park Avenue, and conveyed by gravity into the wastewater treatment plant north of Park Avenue. Flows northeast of SR 410 travel north to the main trunk line on Park Avenue. A small volume of flow is conveyed across SR 410 immediately west of the intersection of SR 410 and SR 165. The sewer system currently only serves the core area of the City of Buckley.

The collection system has considerable infiltration and inflow which hydraulically overloads the wastewater treatment plant during storm events. There are no known bypasses or overflow points in the City of Buckley's sewer collection system. A sewer system rehabilitation program was first developed from an infiltration/inflow (I/I) study in 1973. A second I/I study was completed in 1975. A third I/I study conducted in 1992 and completed in 1994 and resulted in Buckley replacing part of it sanitary sewer collection system. The goal of this continued work on the collection system is to reduce infiltration and inflow by at least 45 percent. As of late 2001, there is no clear indication from wastewater treatment plant flow data that I/I has been reduced. Work continues on the collection system and flows continue to be monitored to determine the effectiveness of the sanitary sewer collection rehabilitation program.

TREATMENT PROCESSES

The existing wastewater treatment facility for the City of Buckley uses an extended aeration activated sludge system to treat the City's wastewater with chlorine disinfection and dechlorination prior to discharge to the White River. The treatment system consists of the following unit processes:

Flow enters the plant through an 18-inch ductile iron pipe into the influent channel. The width of the influent channel is 1-foot 3-inches with a hydraulic capacity of 2.4 MGD and a maximum capacity of 7.0 MGD. Flow passes through an aerated grit chamber where settled grit is removed through an air lift pump to a grit washer and then disposed of in a dumpster. Flow then passes through a Hycor in-channel fine screen with ¼ inch openings, which was added in 1999. Screenings are transported into a washer compactor and then discharged into a dumpster for disposal with other solid waste.

Downstream of the fine screen flow is split between two oxidation ditches to achieve secondary treatment. Each oxidation ditch has a volume of 422,000 gallons and a side water depth of 10.5 feet. Flow from the oxidation ditches flow into two separate rectangular secondary traveling bridge clarifiers

each with an effective settling area of 810 square feet and a side water depth of 10 feet. The traveling bridge assembly spans the clarifier unit and moves back and forth along the length of the clarifier controlling the vacuum sludge and scum removal system. Flow from the two traveling bridge clarifiers passes through a Parshall Flume for effluent flow measurement with a range of flows from 0.03 MGD up to 1.87 MGD. Flow is then split between two identical chlorine contact basins isolated by a 16 inch diameter sluice gate. The flow is disinfected with chlorine gas and then dechlorinated with sulfur dioxide gas prior to discharge to the White River.

Waste sludge is pumped to two aerobic sludge holding tanks, each 89,670 gallons, a side water depth of 12 feet, and fitted with fine bubble diffusers. These aerobic sludge holding tanks were added in 1998.

The publicly owned treatment works (POTW) is classified as a Class 2 facility and is operated by a staff of two certified operators. The operator in responsible charge is certified at the Class 2 level.

DISCHARGE OUTFALL

The outfall line consists of 1,400 lineal feet of 14-inch ductile iron pipe and five manholes. The outfall line passes under the Puget Power Flume and due to the dynamic nature of the channel of the White River Buckley's outfall is no longer in the White River but discharges near the bank of the White River in a channel that parallels the course of the of the river during low flows and merges with the river downstream at a bend in the river.

The City of Buckley's permitted outfall is located on the White River at river mile 21.8. Upstream of the discharge at river mile 24.3, a large portion of the White River flow is diverted through Lake Tapps for power generation and then returned to the White River at river mile 3.6. A fish screen return flow of 20 cfs is returned to the natural river channel at river mile 21 just below the City of Buckley's WWTF outfall. The City of Enumclaw's permitted outfall is located upstream at river mile 23.1.

The instream flow of the natural channel of the White River is regulated by the Federal Energy Regulatory Commission (FERC). Flows may not be diverted into Lake Tapps such that flows in the natural channel of the White River fall below the following schedule as measured at USGS 12100000 located below Bosie Creek at river mile 23.1:

Interim Flows as of July 2001 (below Boise Creek at USGS 12100000)

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
cfs	130	200	275	350	350	250	250	250	275	250	130	130

There are several proposals by FERC and the National Marine Fisheries Service (NMFS) to change these interim flows so that higher flows would be maintained in the natural channel of the White River for salmonid passage.

RESIDUAL SOLIDS

Screenings and grit are taken to the landfill for disposal. Sludge is dried in drying beds and composted onsite for use as a soil amendment and topsoil. Excess sludge is taken to South Sound Soils in Tenino. Sludge volume is approximately 70 dry weight tons per year. Sludge analysis indicates that metals loadings are well below the loadings allowable (mg/kg on dry weight basis) for land application under the federal sludge regulations, 40 Code of Federal Regulations (CFR) 503. Composting is an acceptable method for pathogen and vector attraction reduction.

PERMIT STATUS

The previous permit for this facility was issued on July 28, 1994. The previous permit placed effluent limitations on five-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, Total Residual Chlorine, Total Ammonia, Copper, Mercury, and Zinc.

An application for permit renewal was submitted to the Department on February 10, 1999. The permit has been administratively extended until the present time.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

During the history of the previous permit, information from Discharge Monitoring Reports (DMRs) submitted to the Department indicate the following permit violations:

BOD_5:	There have been eight monthly average and 15 weekly average loading violations, three percent removal violations, and one monthly average and two average weekly concentration violations.
TSS:	There were 11 monthly average and 18 weekly average loading violations, and three percent removal violations.
F. Coliform:	There was one fecal coliform weekly geometric mean violation.
TRC:	There was one maximum daily total residual chlorine concentration violation.
Copper:	There were eight Total Copper daily maximum concentration violations.
Zinc:	There was one Total Zinc daily maximum concentration violation.

The City of Buckley continues to work on infiltration and inflow in their collection system to reduce the peak flows causing their BOD_5 and TSS loading violations. Buckley is also in the process of upgrading their wastewater facility to include biological and chemical removal of phosphorus which along with corrosion control on the water supply for the City will reduce the amount of copper in their wastewater discharges.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization

Parameter	**Concentration or Rate**
Flow	0.4 MGD ADWF – 1.0 MGD AFMM
BOD_5	7.75 mg/L annual average – 13.4 mg/L weekly average
TSS	6.6 mg/L annual average – 11.4 mg/L weekly average
Fecal Coliform Bacteria	3.04 cfu annual average – 16.5 cfu weekly average
pH	6.36 s.u. – 7.51 s.u.
Total Residual Chlorine	0.026 mg/L annual average – 2.0 mg/L maximum
Total Ammonia as N (Summer)	0.64 mg/L annual average – 1.78 mg/L maximum monthly average
Total Ammonia as N (Winter)	1.68 mg/L annual average – 3.88 mg/L maximum monthly average
Temperature (Summer)	17.7°C avg., 20.3°C max month avg., 14.8°C min. month avg.
Temperature (Winter)	11.95°C avg., 13.9°C max month avg., 10.3°C min. month avg.
Total Copper	13.5 µg/L average, 70 µg/L maximum value

Total Mercury	0.0 µg/L
Total Zinc	45.4 µg/L average, 120 µg/L maximum value
Hardness	47 mg/L

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. The Department does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from City of Buckley Facility Plan Supplemental Report titled "Wastewater Treatment Plant Capacity Analysis", prepared by Gray and Osborne, Inc., October 1996, revised March 1997:

Table 2: Design Standards for City of Buckley WWTP.

Parameter	Design Quantity
Monthly average flow (max. month)	1.0 MGD
Monthly average dry weather flow	0.45 MGD
Peak daily flow	1.65 MGD
Instantaneous peak flow	2.7 MGD
BOD_5 influent loading	895 lb./day
TSS influent loading	760 lb./day
Design population equivalent	4,475
BOD_5/TSS Removal Efficiencies	85% minimum

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC are:

Table 3: Technology-based Limits.

Parameter	Limit
pH	Lower bound to 6.0 Standard Units
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The existing permit has a chlorine limit of 9 µg/L monthly average and 23 µg/L daily maximum and the facility is able to comply with it. The proposed permit includes the same limit.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

The BOD_5 monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly influent design loading (895 lbs/day) x 0.15 = **134 lbs/day**. The BOD_5 weekly average effluent mass loading is calculated as 1.5 x monthly loading = **201 lbs/day**. The Puyallup River TMDL set the BOD_5 weekly average mass loading for Buckley at 280 lbs/day which corresponds to a monthly average mass loading of 187 lbs/day. The mass loadings set by the Puyallup TMDL were not as limiting as the influent design loadings. The more limiting influent design loadings control and will be incorporated into the NPDES permit.

The TSS monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly influent design loading (760 lbs/day) x 0.15 = **114 lbs/day**. The TSS weekly average effluent mass loading is calculated as 1.5 x monthly loading = **171 lbs/day**.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The Buckley wastewater facility discharges to the White River at RM 21.8 which is designated as a Class A receiving water in the vicinity of the outfall. Upstream of the Buckley outfall at RM 23.1 is the City of Enumclaw's wastewater outfall. Upstream at RM 24.3, a large portion of the White River flow is diverted through Lake Tapps for power generation and then returned to the White River at RM 3.6. The instream flow of the natural White River channel is currently maintained above 130 cfs at USGS 12100000 located below Bosie Creek at river mile 23.1 by an agreement between Puget Sound Power and Light Company and the Muckleshoot Tribe. There is also a fish screen return flow of 20 cfs returned to the natural river channel below the City of Buckley's outfall.

Characteristic uses include the following: water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	Upper bound to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

Chronic Mixing Zone: 26.75 feet wide, extends 300 feet downstream and 100 feet upstream.

Acute Mixing Zone: 26.75 feet wide, extends 30 feet downstream and 10 feet upstream.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of continuous stream flow and effluent flow data and the RIVPLUM5 model. The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	2.62	11.35
Human Health, Carcinogen		59.6
Human Health, Non-carcinogen		46.6

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

Section 305(b) of the Clean Water Act requires the state to assess the quality of surface waters and to identify impairment of designated beneficial uses pursuant to the state water quality standards (WAC 173-201A). The most recent assessment indicates that the White River (RM 0 to 29.6) occasionally exceeds the fecal coliform criterion. The high fecal coliform count occurs after rainfall events and appears to be related to storm water runoff.

In addition, the upper bound of the water quality criteria for pH (6.5 to 8.5 standard units) is violated in the natural White River channel between the diversion to and outflow from Lake Tapps. Water quality toxicity criteria for ammonia are also seasonally affected by high temperature and pH. Conditions in the White River channel appear to be most limiting for ammonia between May and October.

For aquatic life protection, the critical condition for the White River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of the Buckley outfall was taken from the TMDL study which considered both historical data and an intensive monitoring study conducted in June, 1993. The ambient data used for this permit include the most restrictive values in the immediate vicinity of the Buckley outfall (see Appendix C) as follows:

Parameter	**Value used**
7Q10 low flow	130 cfs
Velocity	1.45 ft/sec
Depth	0.82 feet
Width	107 feet
Roughness (Manning)	n=0.0777
Slope	6.6 E-03 (0.378 degrees)
Temperature	1.5 ^{o}C – 12.7 ^{o}C
pH (high)	8.1
Dissolved Oxygen	11.32 mg/L
Total Ammonia-N	0.013 mgN/L
Fecal Coliform	42/100 mL dry weather, 260/100 mL wet weather (>1300/100 mL storm related)

Turbidity	27 NTU
Alkalinity	24.25 mg/L as CaCO3
Hardness	25.35 mg/L as CaCO3
Metals	Ambient metals concentrations shall be determined from the receiving water study. For reasonable potential determining ambient metals were assumed to be zero due to the lack of sufficient data.
All Other Metals	0.0 (below detection limits)

The critical river conditions for human health protection are defined in EPA's "National Toxics Rule" (NTR, 57 FR 60848, December 1992) as the 30Q5 low flow (30-day average flows with a recurrence interval of five years) for noncarcinogens and the harmonic mean flow for carcinogens. The following summary statistics were estimated using the 14 complete annual periods between November 7, 1986, and December 31, 2001:

	FERC Interim Flows as of July 2001 @ USGS 12100000
Harmonic mean flow	303 cfs
30Q5 low flow	147 cfs

BOD_5--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD_5 was placed in the permit.

The impact of BOD on the receiving water was modeled using Streeter-Phelps analysis of critical dissolved oxygen sag at critical condition and with the technology-based effluent limitation for BOD_5 described under "Technology-Based Effluent Limitations" above. The calculations used to determine dissolved oxygen impacts are shown in Appendix C.

Temperature -- The impact of temperature on the receiving water was modeled using a simple mixing analysis. The input variables were dilution factor of 11.35, upstream temperature 13.1^{o}C, and effluent temperature 20.3^{o}C. This simple mixing analysis resulted in a calculated mixed temperature of 13.73^{o}C and an incremental increase of the ambient water temperature of 0.63^{o}C. The water quality standards for temperature in a class A (excellent) receiving water are not to exceed 18^{o}C and a maximum incremental temperature increase of t = 28/(13.1^{o}C +7) = 1.39^{o}C.

There is no predicted violation of the temperature standard so no permit limit for temperature will be placed in the permit.

pH-- There is currently a TMDL for pH on the White River due to excursions of background pH that sometimes reach 9.3 s.u. downstream of the outfall, therefore the upper bound water quality criteria of 8.5 s.u. and the lower bound technology based limit of 6.0 s.u. was placed in the permit to be protective of the pH criterion.

Fecal coliform-- Since background levels of fecal coliform were found to be above the water quality criterion for fecal coliform the water quality criteria of 100 organisms/100 ml was placed in the permit to be protective of the fecal coliform criterion instead of the technology-based limitation.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-

based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, copper, and, zinc. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for chlorine, ammonia, copper, and, zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The parameters used in the critical condition modeling are as follows: acute dilution factor 2.62, chronic dilution factor 11.35, May-October receiving water temperature 15.2°C, November-April receiving water temperature 8.4°C, effluent hardness 47 mgCaCO3/L, receiving water hardness 23.3 mg $CaCO_3$/L), receiving water total ammonia 0.02 mg/L May-October and 0.04 mg/L November to April, receiving water copper 2.92 µg/L, receiving water lead 1.2 µg/L, receiving water nickel 0.0 µg/L, and receiving water zinc 15 µg/L.

There was very little ambient data available for ammonia and heavy metals. The Permittee is required in section S8 of the proposed permit to perform a receiving water study during the next permit term. This information may result in a permit modification or limits in the next renewal.

Total residual chlorine showed no reasonable potential to violate standards so the effluent limits from the previous permit were placed in the permit for this parameter. Ammonia-N showed no reasonable potential to violate standards, however, effluent limits for May-October Ammonia-N were back calculated from the daily maximum mass loading set by the Puyallup TMDL. No effluent limits for November-April Ammonia-N were necessary. Effluent limits were derived for total copper, which were determined to have a reasonable potential to cause a violation of the Water Quality Standards. Effluent limits for copper were calculated using methods from EPA, 1991 as shown in Appendix C.

The resultant effluent limits are as follows:

Parameter	Average Monthly	Maximum Daily
Total Residual Chlorine	9 µg/L	23 µg/L
Total Ammonia (as NH_3-N) May-October	2.6 mg/L	7.43 mg/L 62 lb/day
Total Copper interim performance based	27 µg/L	38.5 µg/L
Total Copper final water quality based	11.13 µg/L	16.24 µg/L

The proposed permit contains a compliance schedule for meeting the water quality-based limits for copper. The City is currently installing a corrosion control system on the water supply to comply with Department of Health requirements for copper in the City of Buckley drinking water. This system should be completed in June 2003 and we should be seeing results in the wastewater effluent within six months. The proposed permit contains interim limits for copper, as required by Chapter 173-201A WAC, that are based on existing demonstrated performance. The permit also contains water quality derived final permit limits for copper.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific

basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

WHOLE EFFLUENT TOXICITY

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water acute toxicity, and the Permittee will not be given an acute WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water chronic toxicity, and the Permittee will not be given a chronic WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that chronic toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

The City of Buckley has prepared a facility plan for upgrades to their wastewater treatment facility. When these upgrades have been completed another series of effluent characterizations for acute and chronic whole effluent toxicity will be required.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on data collected during the current permit term. The discharge will be re-evaluated for impacts to human health at the next permit issuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the Sediment Quality Standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED JULY 28, 1994

Existing Limits		Proposed Limits	
BOD_5	30 mg/L 111 lbs/day 45 mg/L 167 lbs/day	BOD_5	30 mg/L 134 lbs/day 45 mg/L 201 lbs/day
TSS	30 mg/L 95 lbs/day 45 mg/L 142 lbs/day	TSS	30 mg/L 114 lbs/day 45 mg/L 171 lbs/day
F. Coliform 200/100 mL - 400/100 mL		F. Coliform 100/100 mL - 200/100 mL	
pH 6.0 - 8.5		pH 6.5 - 8.5	
Ammonia-N May-Oct	2.5 mg/L 5.5 mg/L 62 lbs/day	Ammonia-N May-Oct	2.6 mg/L 7.4 mg/L 62 lbs/day
Ammonia-N Nov-Apr	4.5 mg/L 10.5 mg/L	Ammonia-N Nov-Apr	N/A
Chlorine	9 µg/L 23 µg/L	Chlorine	9 µg/L 23 µg/L
Copper	N/A 14 µg/L	Copper	11.13 µg/L 16.24 µg/L

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of the Department's *Permit Writer's Manual* (July 1994) for Oxidation Ditch Activated Sludge Secondary Treatment with Chlorine Disinfection.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for BOD_5, COD, TSS, Ammonia-N, Dissolved Oxygen, Total Residual Chlorine, Fecal Coliform, and pH.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Pierce County Health Department.

PRETREATMENT

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department has been delegated authority to administer the Pretreatment Program [i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)]**.** Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The

requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program [40 CFR 403.8(f)(1)(iii)], the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i)].

The Department is responsible for issuing state waste discharge permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge [WAC 173-216-110(5)] (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a state waste discharge permit 60 days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with state water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a state waste discharge permit application.

Requirements for Performing an Industrial User Survey

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of state waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential

significant industrial users. A complete listing of methodologies is available in the Department of Ecology guidance document entitled "Conducting an Industrial User Survey."

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

RECEIVING WATER STUDY

Proposed permit condition S8 requires a receiving water study to gather information to determine if the effluent has a reasonable potential to cause a violation of the water quality standards.

Total and Dissolved Metals – The receiving water near the outfall will be sampled for both total and dissolved metals as well as hardness to determine if there is a potential to violate water quality standards for metals and to develop translator values for the total recoverable to dissolved fraction of metals.

Dissolved Oxygen - The receiving water near the outfall will be sampled for BOD_5, Total Kjeldahl Nitrogen (TKN), dissolved oxygen, and temperature to determine if there is the potential for a violation of dissolved oxygen standard.

Ammonia - The receiving water near the outfall shall also be sampled for total ammonia, pH and temperature to determine the potential for the effluent to cause a violation of the water quality standards for total ammonia.

pH - Alkalinity will be tested to determine whether the water quality or technology based standard for pH should apply to the discharge.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the FWPCA and RCW 90.48.080.

OUTFALL EVALUATION

Proposed permit Condition S.11 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 21, 2002, and July 28, 2002, in the *Tacoma News Tribune* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on February 26, 2003, in the *Courier Herald* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Carey Cholski
Permit Administrator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6275, or by writing to the address listed above.

This permit and fact sheet were written by Glenn Pieritz.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celcius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at (http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Streeter-Phelps analysis of critical dissolved oxygen sag.

Based on Lotus File DOSAG2.WK1 Revised 19-Oct-93

Notes: Buckley WWTF

INPUT

1. EFFLUENT CHARACTERISTICS

Maximum Month Flow (MGD):	1
Discharge (cfs):	1.55
CBOD5 (mg/L):	51.50
NBOD (mg/L): 4.57*(Ammonia-N + Organic N)	17.73
Dissolved Oxygen (mg/L):	3.90
Temperature (deg C):	22.30

2. RECEIVING WATER CHARACTERISTICS

Upstream Discharge (cfs):	130.00
Upstream CBOD5 (mg/L):	0.90
Upstream NBOD (mg/L): 4.57*(Ammonia-N + Organic N)	0.21
Upstream Dissolved Oxygen (mg/L):	10.75
Upstream Temperature (deg C):	12.70
Elevation (ft NGVD):	720.00
Downstream Average Channel Slope (ft/ft):	0.0066
Downstream Average Channel Depth (ft):	1.19
Downstream Average Channel Velocity (fps):	3.15

3. REAERATION RATE (Base e) AT 20 deg C (day^-1): 36.10

Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	26.36
O'Connor and Dobbins	.1 - 1.5	2 - 50	17.72
Owens	.1 - 6	1 - 2	33.77
Tsivoglou-Wallace	.1 - 6	.1 - 2	86.15

4. BOD DECAY RATE (Base e) AT 20 deg C (day^-1): 0.94

Reference	Suggested Value
Wright and McDonnell, 1979	0.94

OUTPUT

1. INITIAL MIXED RIVER CONDITION	
CBOD5 (mg/L):	1.5
NBOD (mg/L):	0.4
Dissolved Oxygen (mg/L):	10.7
Temperature (deg C):	12.8
2. TEMPERATURE ADJUSTED RATE CONSTANTS (Base e)	
Reaeration (day^-1):	30.44
BOD Decay (day^-1):	0.68
3. CALCULATED INITIAL ULTIMATE CBODU AND TOTAL BODU	
Initial Mixed CBODU (mg/L):	2.2
Initial Mixed Total BODU (CBODU + NBOD, mg/L):	2.6
4. INITIAL DISSOLVED OXYGEN DEFICIT	
Saturation Dissolved Oxygen (mg/L):	10.310
Initial Deficit (mg/L):	-0.36
5. TRAVEL TIME TO CRITICAL DO CONCENTRATION (days):	0.19
6. DISTANCE TO CRITICAL DO CONCENTRATION (miles):	9.97
7. CRITICAL DO DEFICIT (mg/L):	0.05
8. CRITICAL DO CONCENTRATION (mg/L):	10.26

Simple Mixing Analysis
for Temperature

Notes: Buckley WWTF

INPUT	Jan-Dec	May-Oct	Nov-Apr
1. Chronic Dilution Factor at Mixing Zone Boundary	11.35	26.11	10.11
2. Upstream Background Temperature	13.10	13.94	7.73
3. Effluent Temperature	20.30	20.30	13.90
OUTPUT			
1. Incremental Temperature Increase Limit = 28/(T+7):	1.39	1.34	1.90
2. Incremental Temperature Increase:	0.63	0.24	0.61
3. Temperature at Mixing Zone Boundary:	13.73	14.18	8.34

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

Notes: Buckley WWTF

INPUT	Oct-Sep	May-Oct	Nov-Apr
1. CHRONIC DILUTION FACTOR AT MIXING ZONE BOUNDARY	11.35	26.11	10.11
1. UPSTREAM/BACKGROUND CHARACTERISTICS			
Temperature (deg C):	13.10	13.94	7.73
pH:	7.60	7.57	7.60
Alkalinity (mg CaCO3/L):	26.00	26.00	26.00
2. EFFLUENT CHARACTERISTICS			
Temperature (deg C):	20.30	20.30	13.90
pH:	7.51	7.50	7.51
Alkalinity (mg CaCO3/L):	47.00	47.00	47.00
OUTPUT			
1. IONIZATION CONSTANTS			
Upstream/Background pKa:	6.44	6.43	6.49
Effluent pKa:	6.38	6.38	6.43
2. IONIZATION FRACTIONS			
Upstream/Background Ionization Fraction:	0.94	0.93	0.93
Effluent Ionization Fraction:	0.93	0.93	0.92
3. TOTAL INORGANIC CARBON			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	27.78	27.88	28.00
Effluent Total Inorganic Carbon (mg CaCO3/L):	50.48	50.56	50.90
4. CONDITIONS AT MIXING ZONE BOUNDARY			
Temperature (deg C):	13.73	14.18	8.34
Alkalinity (mg CaCO3/L):	27.85	26.80	28.08
Total Inorganic Carbon (mg CaCO3/L):	29.78	28.75	30.26
pKa:	6.43	6.43	6.48
pH at Mixing Zone Boundary:	7.59	7.57	7.59

Water Quality-Based Permit Limits for Acute and Chronic Criteria.
(based on EPA/505/2-90-001 Box 5-2).

Based on Lotus File WQBP2.WK1 Revised 19-Oct-93

Notes: Buckley WWTF Total Residual Chlorine

INPUT	
1. Water Quality Standards (Concentration)	
Acute (one-hour) Criteria:	**19.000**
Chronic (n-day) Criteria:	**11.000**
2. Upstream Receiving Water Concentration	
Upstream Concentration for Acute Condition (7Q10): 95th%-tile	**0.00**
Upstream Concentration for Chronic Condition (7Q10): 90th%-tile	**0.00**
3. Dilution Factors (1/{Effluent Volume Fraction}) or Plumes Model	
Acute Receiving Water Dilution Factor:	**2.62**
Chronic Receiving Water Dilution Factor:	**11.35**
4. Coefficient of Variation for Effluent Concentration	
(0.6 or a calculated CV if there are more than 10 data points):	**0.60**
5. Number of days (n1) for chronic average	
(usually four or seven; four is recommended):	**4**
6. Number of samples (n2) required per month for monitoring:	**1**

OUTPUT	
1. Z Statistics	
LTA Derivation (99%tile):	2.326
Daily Maximum Permit Limit (99%tile):	2.326
Monthly Average Permit Limit (95%tile):	1.645
2. Calculated Waste Load Allocations (WLA's)	
Acute (one-hour) WLA:	49.780
Chronic (n1-day) WLA:	124.850
3. Derivation of LTAs using April 1990 TSD (Box 5-2 Step 2 & 3)	
Sigma^2:	0.3075
Sigma^2-n1:	0.0862
LTA for Acute (1-hour) WLA:	15.980
LTA for Chronic (n1-day) WLA:	65.843
Most Limiting LTA (minimum of acute and chronic):	15.980
4. Derivation of Permit Limits From Limiting LTA (Box 5-2 Step 4)	
Sigma^2-n2:	0.3075
Daily Maximum Permit Limit:	**49.78**
Monthly Average Permit Limit:	**34.11**

Effluent Concentration COV =	0.6
n, number of samples per month =	8

normal distribution

Ammonia-N mgN/L	Daily Max	Monthly Avg
October to September =	18.45	8.18
May to October =	22.73	10.08
November to April =	17.27	7.66

log-normal distribution

Ammonia-N mgN/L	Daily Max	Monthly Avg
October to September =	18.23	8.08
May to October =	22.75	10.09
November to April =	17.13	7.60

log-pearson type III distribution

Ammonia-N mgN/L	Daily Max	Monthly Avg
October to September =	19.14	8.49
May to October =	22.71	10.07
November to April =	17.05	7.56

Water Year October to September Annual Dilution Factor

	18.45	17.90				18.23	17.52
Water Year	**Min Acute**	**Min Chronic**		Date	Date	**Min Acute**	**Min Chronic**
1994	15.3093	16.3140		>9/30/1994	<10/1/1995	1.1850	1.2126
				Date	Date		
1995	18.9100	26.0862		>9/30/1995	<10/1/1996	1.2767	1.4164
				Date	Date		
1996	15.5642	12.8404		>9/30/1996	<10/1/1997	1.1921	1.1086
				Date	Date		
1997	20.0824	18.2585		>9/30/1997	<10/1/1998	1.3028	1.2615
				Date	Date		
1998	23.5149	17.9112		>9/30/1998	<10/1/1999	1.3713	1.2531
				Date	Date		
1999	23.2597	22.8729		>9/30/1999	<10/1/2000	1.3666	1.3593
				Date	Date		
2000	22.7956	21.8556		>9/30/2000	<10/1/2001	1.3579	1.3396
				Date	Date		
2001	19.3837	21.4698		>9/30/2001	<10/1/2002	1.2874	1.3318

May to October Dry Weather Dilution Factor

	22.73	30.74				22.75	30.84
Water Year	**Min Acute**	**Min Chronic**		Date	Date	**Min Acute**	**Min Chronic**
1995	18.9100	31.3466		>4/30/1995	<11/1/1995	1.2767	1.4962

				Date	Date		
1996	22.8154	30.1597		>4/30/1996	<11/1/1996	1.3582	1.4794
				Date	Date		
1997	22.8293	30.4091		>4/30/1997	<11/1/1997	1.3585	1.4830
				Date	Date		
1998	52.1295	43.3357		>4/30/1998	<11/1/1998	1.7171	1.6368
				Date	Date		
1999	46.8435	40.3386		>4/30/1999	<11/1/1999	1.6706	1.6057
				Date	Date		
2000	33.2186	35.8857		>4/30/2000	<11/1/2000	1.5214	1.5549
				Date	Date		
2001	30.4222	32.3405		>4/30/2001	<11/1/2001	1.4832	1.5097
				Date	Date		
2002	43.3276	37.3175		>4/30/2002	<11/1/2002	1.6368	1.5719

November to April Wet Weather Dilution Factor

	17.27	15.95				17.13	15.79
Water Year	**Min Acute**	**Min Chronic**		Date	Date	**Min Acute**	**Min Chronic**
1994	15.3093	16.3140		>10/31/1994	<5/1/1995	1.1850	1.2126
				Date	Date		
1995	26.0585	26.0862		>10/31/1995	<5/1/1996	1.4159	1.4164
				Date	Date		
1996	15.5642	12.8404		>10/31/1996	<5/1/1997	1.1921	1.1086
				Date	Date		
1997	20.0824	18.2585		>10/31/1997	<5/1/1998	1.3028	1.2615
				Date	Date		
1998	23.5149	17.9112		>10/31/1998	<5/1/1999	1.3713	1.2531
				Date	Date		
1999	23.2597	22.8729		>10/31/1999	<5/1/2000	1.3666	1.3593
				Date	Date		
2000	22.7956	21.8556		>10/31/2000	<5/1/2001	1.3579	1.3396
				Date	Date		
2001	19.3837	21.4698		>10/31/2001	<5/1/2002	1.2874	1.3318

Log-Pearson type III frequency factor method	Estimated Using Excel's Statistical Functions climatic year
Number of data points	8
Mean of log10 transformed values	1.2925
Standard deviation of log10 transformed values	0.0737

Skew of log10 transformed values	-0.5140
Recurrence Interval, years	**3**
Estimated K for Log Pearson type III method, 3-yr recurrence	0.143
Acute Annual Dilution Factor	19.14

Log-Pearson type III frequency factor method	Estimated Using Excel's Statistical Functions climatic year
Number of data points	8
Mean of log10 transformed values	1.5028
Standard deviation of log10 transformed values	0.1628
Skew of log10 transformed values	-0.0274
Recurrence Interval, years	**5.4**
Estimated K for Log Pearson type III method, 5.4-yr recurrence	0.900
Acute May - Oct Dilution Factor	22.71

Log-Pearson type III frequency factor method	Estimated Using Excel's Statistical Functions climatic year
Number of data points	8
Mean of log10 transformed values	1.3099
Standard deviation of log10 transformed values	0.0850
Skew of log10 transformed values	-0.5820
Recurrence Interval, years	**5.4**
Estimated K for Log Pearson type III method, 5.4-yr recurrence	0.920
Acute Nov - Apr Dilution Factor	17.05

Log-Pearson type III frequency factor method	Estimated Using Excel's Statistical Functions climatic year
Number of data points	8
Mean of log10 transformed values	1.2854
Standard deviation of log10 transformed values	0.0970
Skew of log10 transformed values	-0.6343

Recurrence Interval, years	**3**
Estimated K for Log Pearson type III method, 3-yr recurrence	0.204
Chronic Annual Dilution Factor	18.43

Log-Pearson type III frequency factor method	Estimated Using Excel's Statistical Functions climatic year
Number of data points	8
Mean of log10 transformed values	1.5422
Standard deviation of log10 transformed values	0.0593
Skew of log10 transformed values	0.4962
Recurrence Interval, years	**5.4**
Estimated K for Log Pearson type III method, 5.4-yr recurrence	0.876
Chronic May - Oct Dilution Factor	30.92

Log-Pearson type III frequency factor method	Estimated Using Excel's Statistical Functions climatic year
Number of data points	8
Mean of log10 transformed values	1.2854
Standard deviation of log10 transformed values	0.0970
Skew of log10 transformed values	-0.6343
Recurrence Interval, years	**5.4**
Estimated K for Log Pearson type III method, 5.4-yr recurrence	0.918
Chronic Nov - Apr Dilution Factor	15.71

	Acute Hardness	Chronic Hardness	
Hardness =	32.78	26.03	mg/L

#	Parameter	Surface Water Criteria, ug/L			
		Dissolved Criteria		Total Recoverable Criteria	
		Acute	Chronic	Acute	Chronic
1	Arsenic	360	190	360	190
2	Cadmium	1.104166734	0.380509838	1.114569317	0.394181125
3	Chromium (Hex)	15	10	15.27494908	10.3950104
4	Chromium (Tri)	220.1070492	59.10942287	696.5412949	68.73188706
5	Copper	5.949133449	3.593367354	6.197014009	3.743090994
6	Iron	---	---	---	---
7	Lead	18.81959926	0.566037542	19.73681517	0.573412672
8	Manganese	---	---	---	---
9	Mercury	2.1	---	2.470588235	0.012
10	Nickel	550.8976549	50.33520701	552.0016582	50.48666701
11	Selenium	---	---	20	5
12	Silver	0.506564772	---	0.595958555	---
13	Zinc	44.48011125	33.40639016	45.48068635	33.88072024

Simple Mixing Analysis

Effluent Hardness =	**47**
Acute Dilution Factor =	**2.62**
Ambient Harness =	**24**
Acute Hardness =	32.78
Effluent Hardness =	47
Chronic Dilution Factor =	**11.35**
Ambient Harness =	24
Chronic Hardness =	26.03

Determining the Requirement for Permit Limits Through a Reasonable Potential Determination to Violate Standards at the Edge of the Mixing Zone.

Based on EPA/505/2-90-001

Notes: Buckley WWTF Copper

INPUT	
Confidence Level and Probability Basis:	**0.95**
Coefficient of Variation for the Effluent Concentration (CV) (0.6 or a calculated CV if there are more than 10 data points):	**0.6**
Number of Effluent Samples or Data Points (ND):	**47**
Highest Effluent Concentration or Value (HV):	**20.8**
Dilution Factors (1/{Effluent Volume Fraction}) or plumes model	
Acute Receiving Water Dilution Factor:	**2.62**
Chronic Receiving Water Dilution Factor:	**11.35**
Water Quality Standards (Concentration)	
Acute (one-hour) Criteria:	**6.19701401**
Chronic (n-day) Criteria:	**3.74309099**
Upstream Receiving Water Concentration:	
Upstream Concentration for Acute Condition (7Q10): 95th%-tile	**0**
Upstream Concentration for Chronic Condition (7Q10): 90th%-tile	**0**
MECB: 1-9 data points, highest value by 2; 10-50 the highest value; >50 calculate 90th %-tile	

OUTPUT	
Percentile Represented by the Highest Concentration in Data Set (p_n) = (1 - confidence level)^1/ND	0.938249865
Normal Distribution Value for 95th Percentile	1.644853476
Normal Distribution Value for 94th Percentile	1.54024667
$\sigma^2 = \ln(CV^2+1)$	0.3074847
C95 = exp(1.645Sigma -0.5Sigma^2)	2.134751686
C94 = exp(1.54Sigma -0.5Sigma^2)	2.014446559
Reasonable Potential Multiplier = C95/C94	1.06
Maximum Expected Concentration of Pollutant in Effluent (MEC):	22.04220057
Acute - Concentration of Pollutant at the Edge of the Mixing Zone (CP):	8.413053651

Chronic - Concentration of Pollutant at the Edge of the Mixing Zone (CP):	1.942044103
Reasonable Potential to Violate Acute Criteria at the Edge of the Mixing Zone (RP):	**YES**
Reasonable Potential to Violate Chronic Criteria at the Edge of the Mixing Zone (RP):	**NO**

Water Quality-Based Permit Limits for Acute and Chronic Criteria.
(based on EPA/505/2-90-001 Box 5-2).

Based on Lotus File WQBP2.WK1 Revised 19-Oct-93

Notes: Buckley WWTF Copper

INPUT	
1. Water Quality Standards (Concentration)	
Acute (one-hour) Criteria:	**6.197**
Chronic (n-day) Criteria:	**3.743**
2. Upstream Receiving Water Concentration	
Upstream Concentration for Acute Condition (7Q10): 95th%-tile	**0**
Upstream Concentration for Chronic Condition (7Q10): 90th%-tile	**0**
3. Dilution Factors (1/{Effluent Volume Fraction}) or Plumes Model	
Acute Receiving Water Dilution Factor:	**2.62**
Chronic Receiving Water Dilution Factor:	**11.35**
4. Coefficient of Variation for Effluent Concentration	
(0.6 or a calculated CV if there are more than 10 data points):	**0.60**
5. Number of days (n1) for chronic average	
(usually four or seven; four is recommended):	**4**
6. Number of samples (n2) required per month for monitoring:	**1**

OUTPUT	
1. Z Statistics	
LTA Derivation (99%tile):	2.326
Daily Maximum Permit Limit (99%tile):	2.326
Monthly Average Permit Limit (95%tile):	1.645
2. Calculated Waste Load Allocations (WLA's)	
Acute (one-hour) WLA:	16.236
Chronic (n1-day) WLA:	42.484
3. Derivation of LTAs using April 1990 TSD (Box 5-2 Step 2 & 3)	
Sigma^2:	0.3075
Sigma^2-n1:	0.0862
LTA for Acute (1-hour) WLA:	5.212
LTA for Chronic (n1-day) WLA:	22.405
Most Limiting LTA (minimum of acute and chronic):	5.212
4. Derivation of Permit Limits From Limiting LTA (Box 5-2 Step 4)	
Sigma^2-n2:	0.3075

Daily Maximum Permit Limit:	**16.24**
Monthly Average Permit Limit:	**11.13**

Buckley WWTF Copper Performanced Based Limits

NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING =	**1**
AUTOCORRELATION FACTOR (ne) (USE 0 IF UNKNOWN) =	**0**
LOGNORMAL TRANSFORMED MEAN =	**2.46**
LOGNORMAL TRANSFORMED VARIANCE =	**0.262**
E(X) =	13.3395
V(X) =	53.403
VARn =	0.2625
MEANn =	2.4595
VAR(Xn) =	53.403
MAXIMUM DAILY EFFLUENT LIMIT =	38.52
AVERAGE MONTHLY EFFLUENT LIMIT =	27.17

Date	Total Copper Monthly Average ug/L	ln(x)
1-Jul-96	10	2.303
1-Sep-96	10	2.303
1-Nov-96	41	3.714
1-Dec-96	10	2.303
1-Jan-97	14	2.639
1-Mar-97	12	2.485
1-May-97	10	2.303
1-Jul-97	10	2.303
1-Sep-97	10	2.303
1-Nov-97	34	3.526
1-Dec-97	10	2.303
1-Jan-98	10	2.303
1-Mar-98	23	3.135
1-Apr-98	10	2.303
1-Jun-98	22	3.091
1-Jul-98	10	2.303
1-Aug-98	10	2.303
1-Oct-98	70	4.248
1-Nov-98	15	2.708
1-Jan-99	10	2.303
1-Mar-99	11	2.398
1-May-99	9	2.197
1-Jul-99	16	2.773
1-Aug-99	12	2.485
1-Sep-99	8	2.079
1-Nov-99	5	1.609
1-Jan-00	6	1.792
1-Mar-00	6.5	1.872
1-May-00	15	2.708
1-Jul-00	18	2.890
1-Sep-00	7.8	2.054

1-Nov-00	20	2.996
1-Jan-01	11	2.398
1-Mar-01	7.2	1.974
1-May-01	8	2.079
1-Jul-01	14	2.639
1-Sep-01	12	2.485
1-Nov-01	13	2.565
1-Jan-02	6.8	1.917
1-Mar-02	5.7	1.740
1-May-02	8.77	2.171
1-Jul-02	10.5	2.351
1-Sep-02	11.1	2.407

APPENDIX D--RESPONSE TO COMMENTS

This response to comments (RTC) is an appendix to the fact sheet for the above referenced NPDES permit. The RTC summarizes comments received during the 30-day public notice and comment period on the draft permit, and provides the Department's response. All changes to the draft permit are noted below. The Department has determined to issue this permit as revised.

Comments were received from Citizens for a Healthy Bay.

Citizens for a Healthy Bay Comments:

1. **Comment:**

Mixing zone: A mixing zone, which allows discharge of pollutants that exceed the state water quality standards into Commencement Bay, is not in the spirit of the Clean Water Act. The objective of this act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The routine authorization of mixing zones is counterproductive to meeting this objective. It is clearly stated in section 1251 of the CWA that, "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited," and that "it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985." The Department's failure to phase out these mixing zones or even to include sunset language, which will encourage movement towards the elimination of these zones does nothing to achieve the goals of the CWA and is in direct violation of the spirit of the act. This wholesale authorization of mixing zones violates water quality standards determined and implemented by the state of Washington. The City of Buckley should be required to meet water quality standards at the end of the pipe.

Response:

The mixing zone for the City of Buckley's wastewater treatment facility discharge was established in accordance with, and authorized under, WAC 173-201A-100. The permit process is not the forum to address your concerns which would be better served during the update to WAC 173-201A which is currently underway. No change to permit.

2. **Comment:**

Anti-degradation: The White River is a class "A" water body. The anti-degradation policy in the state of Washington's Pollution Control Act WAC 173-201A-070 clearly states, "Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." Discharging pollutants known to be injurious to fish populations in amounts that exceed state water quality standards in an area which characterizes fish migration, rearing, and spawning habitat among the "beneficial uses" is in violation of this act and should not be allowed.

Response:

The permit limits derived for the discharge from the City of Buckley's wastewater treatment facility are in compliance with the state of Washington water quality standards established in

WAC 173-201A. As stated in the previous comment, the proper forum to address your concerns is the update to WAC 173-201A, which is currently underway. No change to permit.

3. **Comment:**

Infiltration The City of Buckley's plant was constructed in 1952 and later upgraded to achieve secondary treatment in 1980. Infiltration studies completed in 1973, 1975, and again in 1994 determined that infiltration and inflow of stormwater need to be reduced by at least 45 percent. As of late 2001, there was no clear indication that infiltration and inflow had been reduced. It is vital that this facility be upgraded and that the 2/3 of the system that is still constructed of clay pipes with mortared joints be replaced.

Response:

The City of Buckley has submitted a Comprehensive General Sewer/Facility Plan for upgrades to their wastewater treatment facilities. Buckley also completed an intensive program that replaced over 1/3 of their collection system. Infiltration and inflow work on the Buckley wastewater collection system will continue although at a much slower rate as funds allow. Should sanitary sewer overflows begin occurring, the City would be required to implement a sanitary sewer bypass elimination program. No change to permit required.